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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/781,247	02/18/2004	Chou San Nelson Loke	ASMJP.145AUS	3140
20995 7590 04/16/2008 KNOBBE MARTENS OLSON & BEAR LLP 2040 MAIN STREET FOURTEENTH FLOOR IRVINE, CA 92614				
EXAMINER				
CHEN, KEATH T				
ART UNIT		PAPER NUMBER		
1792				
NOTIFICATION DATE		DELIVERY MODE		
04/16/2008		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/781,247

**Applicant(s)**

LOKE ET AL.

**Examiner**

KEATH T. CHEN

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**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 9-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 23-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

The specification amendment filed on 11/13/2007 is entered. The claim amendment filed on 11/13/2007, addressing rejection of claims 1-8 from the first office action (07/13/2007), by amending claims 1, 6, and 7; and adding claims 23-29, is acknowledged and will be addressed below.

### ***Election/Restrictions***

1. Applicant's confirmation of election without traverse of Invention I, claims 1-8, in the reply filed on 11/13/2007, is acknowledged.
2. Claims 9-22 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Invention II, there being no allowable generic or linking claim. Election was made without traverse in the reply filed on 11/13/2007.

### ***Claim Rejections - 35 USC § 102***

The text of those sections of Title 35 U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1, 6, and 26-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Cox et al. (US 6418874, hereafter '874).

'874 teaches some limitations of claim 1:

A thin-film deposition system (Fig. 1, #10) comprising: an evacuable (by pump #82, col. 5, line36) plasma CVD reactor (region enclosed by bottom plate #60 and side wall #14) comprising a susceptor (substrate support member #72, col. 5, line 18) and a showerhead (a gas delivery ring with a series of nozzles at the chamber top, col. 6, lines

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35-38); an RF power generator (bias generator #86, col. 6, line 13) arranged outside the plasma CVD for forming plasma discharge (bias generator #86 is capable of forming/assisting in forming plasma discharge by adjusting power) between the susceptor and showerhead (plasma is between susceptor and showerhead, col. 3, lines 56-58); a remote plasma chamber (reactor cavity #108, col. 6, lines 49-50) arranged outside the plasma CVD reactor (#104, col. 6, lines 44-46), for providing active species to an interior of the plasma CVD (col. 6, lines 46-52); and an electromagnetic wave generator (#28, toroidal plasma source) arranged outside the plasma CVD reactor (above #60), the RF power generator (#86), and the remote plasma chamber, for emitting electromagnetic waves to the interior of the reactor (toroidal plasma source is to provide energy to the interior of the reactor) for cleaning an inner surface of the reactor (col. 2, lines 30-32).

Applicant's claim requirement "for cleaning an inner surface of the reactor" is considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

'874 further teaches the limitation of:

Claim 6: The system according to Claim 1, further comprising a controller (#44, col. 4, line 11) which is set to activates the electromagnetic wave generator (#28, through connection of RF generator #20 and leads 24, 26 to ferrite core #22A, col. 10, lines 29-31) only for reactor cleaning (col. 2, lines 26-28, controller is capable of being set to activate #28 only for reactor cleaning because the timing and the level of RF power is controlled, col. 7, lines 5-7).

Applicant's claim requirement "only for reactor cleaning" is considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

Claim 26: The system according to claim 1, wherein the electromagnetic waves have power (3-5 kW, col. 5, lines 55-56) effective to facilitate the cleaning of the inner surface of the reactor.

Applicant's claim requirement "to facilitate the cleaning of the inner surface of the reactor" is considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for

the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

Claim 27: The system according to claim 26, wherein the electromagnetic waves have power in the range of 100-5,000 W (3-5 kW, col. 5, lines 55-56).

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35 U.S. Code not included in this action can be found in a prior Office action.

4. Claims 2-4, 7-8, 23, and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cox et al. (US 6418874, hereafter '874), further in view of Kabansky (US 20020179248, hereafter '248).

'874 teaches all limitations of claim 1, as discussed above. '874 further teaches the RF frequency for the generator #20 at 200 MHz (0.2 GHz) and connected from the top of the chamber. '874 criticizes the erosion of dome by the coil affecting the throughput of the plasma system (col. 2, lines 1-19).

'874 does not explicitly teaches the limitations of:

Claim 2: The system according to claim 1, wherein the electromagnetic waves are microwaves.

Claim 3: The system according to claim 1, wherein the reactor and the electromagnetic wave generator are connected by a waveguide.

Claim 4: The system according to claim 1, wherein the reactor comprises a sapphire window where the waveguide is connected.

Claim 7: The system according to claim 1, wherein the electromagnetic wave generator is connected to a side wall of the reactor in a direction perpendicular to an axis of the susceptor and the showerhead.

Claim 23: The system according to claim 2, wherein the microwaves have a wave length effective to facilitate cleaning of the inner surface of the reactor.

Applicant's claim requirement "to facilitate cleaning of the inner surface of the reactor" is considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

Claim 28: The system according to claim 7, wherein the reactor and the electromagnetic wave generator are connected by a waveguide.

Claim 29: The system according to Claim 28, wherein the reactor comprises a sapphire window where the waveguide is connected.

'248 is an analogous art in the field of semiconductor wafer processing including cleaning (abstract, '874, col. 2, lines 30-32), particularly in reducing particles ([0014], '874, col. 2, line 16) and a dual power (Fig. 2, microwave #142 and RF #174; '874, toroidal plasma #28 and RF bias #86) apparatus for simultaneous application to the wafer ('248, abstract). '248 provides a microwave power and gas delivery set up that increases the lifetime of the hardware ([0014]), a feature that '874 desired. '248 provides a microwave generator (#142) connected to a wide wall (#160, see [0038]) through a waveguide (#144, [0027]) and the outlet (#152, [0028]) of sapphire ([0041]) plasma tube (#146, [0028]) to facilitate the dual power application to the wafer.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '248 with '874. Specifically, to have replaced the toroidal source #28 in Fig. 1 of '874 with a microwave plasma system as taught by '248 for its suitability for the dual power application. Note that the sapphire tube (#146) is a sapphire window (transparent) that connected to the waveguide (#144). For claim 23, any microwave wave length is considered effective wave length.

Motivation to combine would have been the suitability use the plasma power source. The selection of something based on its known suitability for its intended use



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has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).

'874 further teaches the remote plasma system is a microwave plasma, but is silent whether it is capacitive or inductive.

'874 does not explicitly teaches the limitation of:

Claim 8: The system according to claim 1, wherein the remote plasma generates an inductively-coupled plasma.

'248 teaches the remote plasma can be an inductively coupled plasma or a microwave plasma ([0005]).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined adopted an inductively coupled remote plasma, as taught by '248, in the apparatus in Fig. 1 of '874 for its suitability.

The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over '874, further in view of '248 and Houchin et al. (US 5202095, hereafter '095).

'874 teaches all limitations of claim 1, as discussed above. '874 and '248, together, teaches replacing toroidal source with a microwave system, as discussed above.

'874 does not teach the limitation of claim 5:

The reactor and the electromagnetic wave generator are connected by a co-axial cable.

'095 is an analogous art in the field of semiconductor plasma etching (field of invention), particularly in solving the problem of processing uniformity (col. 1, lines 43-50, '874, col. 2, lines 42-46). '095 teaches the use of coaxial cables being more advantageous over the use of waveguides for the purpose of miniaturization (col. 2, lines 20-22).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '095 with '874 and '248. Specifically, to have replaced the waveguide (#144) in the microwave system in the apparatus in Fig. 2 of '248 with coaxial cable (and then combined with Fig. 1 of '874), for the purpose of miniaturization. Note that the replacement with cable would not be a problem to the gas hole for the plasma into outlet #152.

6. Claims 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over '874 and '248, further in view of Yanase (US 20020117473, hereafter '473).

'874 and '248, together, teach all limitations of claim 23, as discussed above.  
'248 is silent on the wave length and frequency of the microwave.

'874 and '248, together, do not explicitly teach the limitations of:

Claim 24: The system according to claim 23, wherein the microwaves have a wave length of  $3 \times 10^{-4}$  to  $3 \times 10^{-1}$  m or a frequency of 1 to 1000 GHz.

Claim 25: The system according to claim 24, wherein the microwaves have ultrahigh frequencies of 0.3-3 GHz.

'473 is an analogous art in the field of cleaning plasma etching apparatus (field of invention), particularly in solving the problem quartz etching during microwave introduction containing fluorine ([0011]), the same problem '248 is solving ([0014]). '473 teaches microwave frequency of 2.45 GHz ([0049], lines 10-11).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '473 with '874 and '248. Specifically, to have adopted microwave frequency of 2.45 GHz in the MW power generator (#142) in Fig. 2 of '248 (and then combined with '874) for its suitability.

The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).

***Response to Arguments***

Applicant's arguments filed on 11/13/2007 have been fully considered and will be addressed below:

7. Applicant's amendment of specification [0044], see the third paragraph of page 6, overcome drawing objection to Fig. 1.
8. In regarding to 35 USC 102(b) rejection of claims 1-3 and 8 based on Stinnett et al. ('678), see the second complete paragraph of page 7 to the first complete paragraph of page 8, applicant's amendment overcome the rejection because '678 does not have an additional RF generator.
9. In regarding to 35 USC 102(b) rejection of claims 1 and 6-7 based on Cox et al. ('874), see the second complete paragraph of page 8 to the second complete paragraph of page 9, applicant argue the amendment overcome the rejection because applicant consider the reactor/chamber include the toroidal plasma source #28 and that the electromagnetic wave generator (#28) of '874 is not for cleaning an inner surface of the reactor, see the last paragraph of page 8.

The chamber is interpreted under the broadest interpretation. The small gas holes (Fig. 1, where labels #70 are) clearly indicate an evacuable chamber below plate #60. The "for cleaning ..." is intended use and does not have structural limitation, as discussed in claims 1 and 6 rejection above. The amendment does overcome the 102(b) rejection of claim 7, which is rejected under 103(a) as discussed above.

10. In regarding to 35 USC 103(a) rejections of claims 4 and 5 and newly added claims 23-29, see the third complete paragraph of page 9 to the first paragraph of page

10, applicant's argument is based on the patentability of the parent claims. Since the parent claims are found not patentable, all dependent claims are not patentable.

### ***Conclusion***

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEATH T. CHEN whose telephone number is (571)270-1870. The examiner can normally be reached on M-F, 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. T. C./  
Examiner, Art Unit 1792

/Michael Cleveland/  
Supervisory Patent Examiner, Art Unit 1792